spacing reduction will increase the potential for interference among IF-related stations. If the Commission is relying on future improvements in FM receiver design to justify the proposed change, it appears to be acting prematurely.

5. *Technical "Flexibility"*.

The Commission has touted technical "flexibility" as a substitute for clear technical standards for preventing interference from nontelevision sources.[117/] History has shown that the case-by-case approach to general allocations policy yields increased interference and degradation of service, with fringe areas and smaller communities suffering the most. The Commission need only witness the current comparative disadvantage of AM radio to recognize that the public is best served by clear-cut allocation policies and interference standards. Indeed, the Commission presently has the opportunity to start cleaning up the AM band by adopting more responsible technical standards.[118/]

"Flexibility" can become a euphemism for decisions that lack the rule of law. The basic policy on interference should adhere to sensible and certain engineering principles,

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117/ See *Amendment of Part 73 of the Commission's Rules to Permit Short-Spaced FM Station Assignments by Using Directional Antennas*, 4 F.C.C. Rcd. 1681 (1988); *Commission Policy Regarding Terrain Shielding in the Evaluation of Television Translator, Television Booster, and Low Power Television Applications*, 3 F.C.C. Rcd. 7105 (1988); *Policies Regarding Detrimental Effects of Proposed New Broadcast Stations on Existing Stations*, 3 F.C.C. Rcd. 638 (1988).

118/ *AM Broadcast Service*, 4 F.C.C. Rcd. 3835 (1989).

with adjustments and deviations where particular circumstances warrant.

6. *Heralding the Benefits and Ignoring the Costs of New Technologies that Generate Interference.*

Most, if not all, of the proposals that threaten the public's television service involve new or expanded services that are perceived to be desirable. In choosing to permit these new facilities or services, the Commission has almost universally ignored the value of maintaining the public's existing television service and preserving opportunities for expanding that service and improving its quality. A recent example of the Commission's preoccupation with new technologies is its decision in November 1988 in *Transtrack, Inc.* to allow the operation of a vehicle monitoring service that relies on a meteor burst communications system.[119/] As mentioned earlier, the meteor burst system reflects radio frequency energy from a transmitting source off the ionized trails of billions of tiny meteors that enter the earth's atmosphere at altitudes of approximately 100 miles. Because the meteor trails are so high, transmissions can be reflected over the horizon for distances of up to 1200 miles. The applicant, a company called Transtrack, proposed to use this system to track motor carrier traffic around the country. But Transtrack will operate on frequencies around 44 MHz, which

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119/ *Transtrack, Inc.*, 3 F.C.C. Rcd. 6833 (1988).

has the potential to interfere with every television channel, since all television receivers modify the incoming signal so that it falls in a band of intermediate frequencies between roughly 41 and 47 MHz.120/

MST urged the FCC to require more thorough tests of potential interference from the Transtrack system. Based on MST's analysis, the Transtrack system could cause television interference within a radius of up to ten miles from each base station and four miles from each mobile unit. But the arguments of television broadcasters fell on deaf ears at the Commission. In its order released in November 1988, the Private Radio Bureau seemed captivated by the high tech nature of the meteor burst proposal. Either knowingly or unknowingly, the Bureau used the novelty of the system to sidestep the interference question, saying that granting Transtrack a waiver to the existing rules on interference "will encourage the further development of this new technology without increasing the interference potential to existing Commission licensees."121/

It was self-contradictory for the Commission in September 1988 to extol the virtues of free, local, and universal over-the-air television service in its tentative

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120/ A meteor burst systems operating outside the IF band does not create this risk. For example, a meteor burst system proposed for 48.65 MHz is pending before the Commission. *Enron Corp.*, 4 F.C.C. Rcd. 1790 (1989).

121/ *Transtrack*, 3 F.C.C. Rcd. at 6835-36 ¶ 25.

decision on ATV,[122/] yet in November of the same year authorize a meteor burst system that has the potential to degrade the existing quality of service from all television licensees throughout the nation. It appears that the FCC has been saying that it will make existing television licensees -- who have provided service in the public interest for years -- bear the risk that interference from some experimental non-television service will impair their ability to continue serving the public as well in the future.

The Commission's recent decisions and policies on spectrum use in effect place on television broadcasters the risk that the kind of degradation in service threatened by Transtrack's interference to Channel 7 will cause disgruntled consumers to switch permanently to cable (those who have that option and can afford it), thereby eroding further the viewer base necessary to support a nationwide system of free, local, and universal television broadcast service. This situation is no different in principle from a city council permitting zoning variances to the point where merchants become surrounded by newly built factories that emit smoke, thereby causing disgruntled customers to patronize stores in cleaner areas not surrounded by conflicting non-retail uses. It has long been recognized at common law that an incompatible land use cannot intrude on an area to the detriment of land uses

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122/ *Advanced Television Systems*, 3 F.C.C. Rcd. at 6525 ¶ 39.

that were there first.[123/] The fairness and common sense of that common law rule should influence the Commission when it addresses analogous problems of incompatible nontelevision spectrum uses that have the cumulative effect of degrading the quality of television signals. At present, however, it is unclear from any portion of the Communications Act or the court decisions construing it how the Commission could conclude that the public interest from a given nontelevision spectrum use being proposed (such as tracking motor carrier traffic around the country) should take priority in federal communications policy over the public's right to continue to receive clear television service free of charge throughout the nation.

## IV. THE COMMISSION SHOULD INITIATE AN INQUIRY SEEKING COMMENT ON STANDARDS AND PROCEDURES TO REGULATE CUMULATIVE INTERFERENCE TO TELEVISION BROADCAST SERVICE.

MST requests that the Commission initiate an inquiry to address the degradation of television broadcast service. The scope of this interference problem requires that such an inquiry encompass several categories of questions.

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123/ E.g., *Dill v. Excel Packing Co.*, 183 Kan. 513, 525, 526, 331 P.2d 539, 548, 549 (1958).

A. *Defining Interference*.

The Commission should seek to identify the appropriate measure or measures of interference to television service. As described above, the Commission's current definition equates interference with loss of service, as defined in terms of the TASO studies undertaken 30 years ago. This concept has not been updated to take into account changes in consumer tastes and technologies. Nor does it take into account degradation of service due to interference. It also does not take into account interference to service where either the service or interference is not predicted to exist, but where it does in fact exist (because of unusual terrain or the use of outside antennas or other factors).

At a minimum, interference consists of energy and signal, which manifest themselves in two generic sources: (1) television-to-television interference, and (2) nontelevision-to-television interference. As described in Part I, the Commission has developed criteria for protecting against some interference from the first source by adopting separation distances between television stations and other requirements. MST does not ask that the requested inquiry address these requirements. Although these requirements would not be deemed to provide adequate protection to the public's service if the Commission today were starting with a clean slate (these requirements would have to be tightened to reflect advances in technologies and in the quality of picture and sound demanded by consumers), the television band is largely saturated. It

is not possible to start with a clean slate, nor realistic to erase the existing slate. And the Commission's record of administering its television-to-television standards has been, with some unfortunate exceptions, careful and conscientious.124/

But the Commission has addressed the second source of nontelevision-to-television interference only on an ad hoc basis. With respect to this second set of interference problems, which have grown like topsy over the past decade, the Commission therefore should ask:

1. How should nontelevision-to-television interference be defined?

2. What technical parameters should be used to measure this source of interference?

3. Should interference to broadcast channels be defined differently from interference to auxiliary broadcast channels?125/

The amount of interference depends on the number of sources of interference and the manner in which those sources are being operated. Interference can be caused by: (1) a single source; (2) multiple sources of the same type and/or

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124/ See *Basic Media, Ltd.* v. *FCC*, 559 F.2d 830 (D.C. Cir. 1977).

125/ Interference to a studio-to-transmitter link or to a remote news pickup from the scene of a breaking news event can be devastating. It can wipe out service to a station's entire service area.

mode of operation; and (3) multiple sources from different types and/or modes of operation. Therefore, the Commission should ask:

4. How should interference be defined to take account of multiple sources of the same type and/or mode of operation?

5. How should interference be defined to take account of multiple sources of different types and/or modes of operation?

6. How should interference be evaluated when it is predicted to occur in an area where no service is predicted to exist (because the area is outside the station's Grade B contour), but where service does in fact exist (due to unusual terrain features or viewers' uses of special receiving antennas)? How should interference be evaluated when it occurs in an area (inside a station's Grade B contour) where interference from an existing source is predicted to destroy service, but where service does in fact exist?

7. How should interference be evaluated where it is not predicted to exist, but where it does exist (due to terrain or other factors)?

The Commission's approach to defining interference in terms of loss of service does not permit it or the public to take lower levels of interfering signals and aggregate them so that they may be compared with the regulatory standard for unacceptable interference. In order to regulate the cumulative effect of interference from multiple sources, the

Commission may find it necessary to use new methods of categorizing and measuring interference. Some types of interference are linear in the sense that their combined effect on signal quality is additive and can be readily predicted. Other types of interference cannot simply be added to determine the combined amount of signal degradation; their interaction is nonlinear and may be far more difficult to predict. Thus, the Commission should ask:

8. How should interference be defined and measured to account for both linear and nonlinear effects on the cumulative degradation of television signal quality?

B. *Technological Advances And Consumer Preferences*.

Technological advances in consumer electronics have dramatically improved the quality of both audio and video signals and will continue to do so. One consequence is that equipment with greater sensitivity to the desired signal is also often more sensitive to undesired signals and therefore more vulnerable to interference. With the advent of HDTV and other advanced television technologies, this trend will continue. Another consequence is that consumers have become accustomed to higher levels of aural and visual clarity in programming. Both developments are relevant to the technical standards that the Commission ultimately should establish for television interference.

As consumers see pictures with higher resolution and hear sounds with higher fidelity, it is reasonable to expect that they have become, and will continue to become, less

tolerant of off-the-air television broadcasts having an inferior picture and sound.[126/] This trend is reinforced by the recent availability of competing video media that provide pictures not subject to interference. This contrast, of which increasing numbers of the public have been made aware, has accelerated the development of higher viewer standards with respect to the technical quality of the public's television service.

This escalation of viewer expectations has already been documented. Under the auspices and direction of the FCC's Advisory Committee on land mobile sharing, CBS Laboratories conducted a series of comprehensive tests that showed that what viewers once regarded as "good" television service quality is regarded as "acceptable" -- two TASO grades lower.[127/] The TASO results are 30 years old. Consumer tastes have been upgraded. There is no reason to believe that they will not continue to rise.

Because of these technological developments and changes in consumer standards, the Commission should ask:

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126/ By comparison, compact discs first began selling in significant quantities in 1983. Despite their higher price, CDs by 1987 outsold vinyl records as the preferred mode for prerecorded music. Recording Industry Association of America, Inc., News Release, Mar. 6, 1989.

127/ B. Jones, *supra* note 106.

1. How should consumer preferences be used when setting maximum levels of interference or minimum levels of signal quality?

2. Just as consumers' subjective standards have evolved to higher and higher planes by imperceptible degrees, so the erosion of service by interference from new sources has often occurred by imperceptible degrees. Accordingly, how should interference standards be set to take into account interference increases that individually may not be consciously discernible to consumers?

3. How often should the Commission's technical parameters on television interference be revised to account for changing consumer tastes and advances in electronics? By what procedures should the Commission amend its standards in these circumstances? Should a special review of this kind be linked to the development of high definition television? Should the Commission automatically reexamine its interference standards for television service on a recurring basis, such as a triennial review?

4. Should the Commission mandate new regulations affecting television receiver specifications in light of new evidence on consumer tolerances for interference?

5. As demonstrated above, reliance on consumer complaints is an ineffective and illusory regulatory tool for dealing with interference. What techniques should replace Commission reliance on consumer complaints for determining

when interference occurs and when enforcement or other remedial action should be taken?

C. *Alternative Regulatory Models*.

There are at least four different approaches to controlling interference once the Commission has resolved how it is to be defined. The Commission should solicit comment on the advantages and disadvantages of each of the following regulatory models, with the objective of articulating the most feasible and efficacious regulatory scheme to adopt, which might include elements from more than one model. It also should invite the submission of other suggested approaches.

*1. No-Interference Approach*.

This model would be the simplest and most direct approach for addressing interference. The Commission would prohibit any new nonbroadcast operation in, or affecting, the television bands, and it could gradually eliminate or ameliorate existing nonbroadcast operations that impair television service. The approach would, in effect, avoid the difficult measurement problems discussed above but would not solve the definition problems addressed above. Even if this approach is not concluded to be satisfactory as a long-term solution, it could be used in the form of an interim

moratorium until longer-range solutions have been crafted and put in place.128/

2. *Threshold Approach*.

This approach would be straightforward in the case of a single source of interference. Each new potential source of interference would have to comply with standards set by the Commission on the basis of pre-established predictions of probable interference. This approach would be, in effect, a model that regulates the inputs for interference. It would be analogous to regulating the amount of hydrocarbons that an individual automobile could emit.

The threshold approach could also be extrapolated to take into account multiple sources that exhibit linear interference properties. However, it would be extremely difficult, if not impossible, to develop an approach that takes into account multiple sources that exhibit nonlinear properties. The Commission should solicit comment as to how -- perhaps through a theoretical model or an experimental model -- such an approach could be developed. Comments should also address how the Commission should treat situations where, as frequently occurs, reality differs significantly from predictions and the public consequently is threatened with an actual loss or degradation of service.

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128/ The 1948-52 freeze on new television allotments and the 1987 HDTV freeze on new television stations within 150 miles of the top 30 markets are examples of where the Commission has wisely used this technique in the past.

3. *Ceiling Approach*.

This approach would establish criteria for allowing interference from all classes of operations up to a certain level. Once these operations reached the interference ceiling, the Commission would not allow any further licensing of interfering operations. The ceiling approach would require an analysis of the interference caused by existing operations and then would evaluate the additive impact of additional sources of interference. This approach would also have to include techniques for taking into account how actual interference consequences differ from interference predictions.

The ceiling approach would be analogous to regulating air pollution by requiring that, once the level of sulfur dioxide in the air in a particular locale reached a specified level, no more refineries could be licensed there. This result would differ from the threshold approach, under which the Commission would continue to license operations as long as they met input regulations that were predicted to limit interference. Under the ceiling approach, however, the Commission would not license any operation (even if the operation would comply with the input regulation under the threshold approach) once the aggregate level of interference had reached a certain level.

4. *Certification and Monitoring Approach*.

Under this approach, the Commission (or some private organization with sufficient expertise) would periodically monitor the signal quality of television service in a locale and determine whether the licensing of a new nonbroadcast operation would harm television service there. Existing nonbroadcast operations could also be monitored to determine whether it would harm television signals for them to expand their operations. This approach is not necessarily mutually exclusive with respect to the threshold approach or the ceiling approach. The practical problem with this approach is that, actual interference and service characteristics can vary significantly from home to home, even among households in close proximately to each other. Time, weather, and seasonal differences are additional complications. As a consequence, an effective monitoring program could be complicated and costly.

5. *Analogies to Other Statutes or Regulations*.

Under any of these regulatory approaches, it may be useful for the Commission to examine the framework of federal or state statutes and regulations that address problems of pollution or trespass on a public resource. Federal clean-air legislation, for example, recognizes that, even though an individual factory may have only a slight effect on the aggregate levels of air pollutants in a particular geographic region, the cumulative effect of many such pollution sources (and multiple kinds of pollutants) can be to degrade air

quality in that area significantly. Thus, the Clean Air Act requires the Environmental Protection Agency to establish plans to reduce pollution in "nonattainment areas" and "to prevent significant deterioration" of air quality in regions not currently violating ambient standards for air quality.[129/] To receive a permit to emit pollutants, a person must show that his proposed facility will use "the best available control technology for each pollutant subject to regulation"[130/] and will not violate ambient air quality standards or produce more than a prescribed increment of added pollution.

The regulatory system provided for by the Clean Air Act might give the Commission guidance as to how it could establish an enforcement system by which to prevent deterioration of television broadcast service. Therefore, the Commission should ask:

1. Should it require an "Interference Impact Statement" for all proposed spectrum uses that is analogous to an Environmental Impact Statement? If so, what should such a statement be required to contain? With what level of certitude and specificity should an applicant be required to demonstrate that its proposed use would not cause interference to television service? What legal significance should attach

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129/ 42 U.S.C. § 7471. See also D. Currie, *Air Pollution: Federal Law and Analysis* § 7.02 at 7-5 (1989).

130/ 42 U.S.C. § 7475(a)(4).

to representations made in an "Interference Impact Statement" and how should they be enforced?

2. What statutes or regulations in other areas provide a suitable model for controlling problems of cumulative interference to television service? What are the advantages and disadvantages of the Commission following the substantive and procedural framework of a given statute, such as the Clean Air Act or other statutes of that sort?

3. Should the Commission distinguish between "attainment" and "nonattainment" areas for purposes of television interference? How would "attainment" be defined? By what enforcement mechanisms would the Commission bring a nonattainment area into compliance with interference standards?

4. Should the Commission require that new spectrum users employ the "best available technology" for preventing interference to television signals even if they otherwise meet the threshold, ceiling, or other interference requirements that the Commission may adopt?

D. *Administration Within the Commission*.

As Part I of this Petition demonstrates, the sources of interference to television signals do not arise strictly under the jurisdiction of the Mass Media Bureau, the Common Carrier Bureau, the Private Radio Bureau, or the Field Operations Bureau. Worse, the Office Commission's of Engineering and Technology (OET) seems to have no regular and specific role with respect to interference issues. Therefore, a

practical issue concerns where, within the Commission, such interference matters would be resolved, and by what procedural mechanism:

1. Should television interference matters be decided by OET and/or by a single bureau? If so, which bureau?

2. Should the Commission establish a single "Interference Ombudsman" for resolving such matters? If so, what qualifications should the "Ombudsman" have, what authority should the Commission delegate to him, and how should his responsibilities be coordinated with OET?

3. Alternatively, should the Commission create an "Interference Board" with a representative from each of several relevant bureaus as well as from OET? What authority should the Commission delegate to this "Board"?

4. When a new spectrum use (which will cause interference to television signals) purports to create a novel public interest benefit, by what process should the Commission weigh that benefit against the public interest benefit represented by the continued availability of free, local, and universal television broadcast service?

5. Does the Commission have sufficient enforcement powers under the Communications Act to carry out regulations for controlling interference to television signals in a meaningful way? If not, what additional statutory authority is needed?

6. Finally, but not least importantly, what additional resources -- expert engineering personnel,

computers and software, laboratory resources, and other support -- should the Commission establish to carry out the above program? Should it seek supplemental appropriations for this purpose?

E. *Interim Relief*.

An inquiry and subsequent rule making proceeding to remedy the interference problem currently confronting television broadcasters is likely to take several years to complete. In the interim, for the reasons explained in Part II of this Petition, the public interest will suffer if new sources of interference are authorized. Therefore, several questions regarding interim relief are appropriate:

1. What interim relief is appropriate to prevent interference harm to the public's television service during the pendency of this and possible subsequent proceedings?

2. Is an across-the-board or partial freeze on the authorization of interfering spectrum uses justified? If so, which proposed uses?

## V. CONCLUSION

MST requests that the Commission issue a notice of inquiry to address the significant deterioration in the quality of television broadcast service that has resulted from Commission decisions permitting higher ambient levels of electromagnetic interference. Such action is necessary to protect the valuable public resource represented by the nationwide system of free, local, and universal over-the-air television service. MST does not ask that the Commission

revisit its mileage-separation rules and other rules for preventing television-to-television interference. Rather, the inquiry should seek comment on how the Commission would implement a comprehensive policy to prevent the significant deterioration in the quality of television broadcast service caused by new sources of nontelevision-to-television interference.

MST has presented here a number of specific questions and suggestions upon which a notice of inquiry should request comment. The Commission should also consider the utility of ordering oral argument or panels after the issues raised in this Petition have been more fully developed.

Respectfully submitted,

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